



National Aeronautics and Space Administration

## **PANEL: NASA Human / Systems Integration (HSI)**

### **Presentation: HSI in the Program Life Cycle**

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- Defined for NASA in the NASA Systems Engineering Handbook





# Integration of Human Concerns

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**For effective consideration, Human/Systems Integration (HSI) must be thoroughly integrated with the Systems Engineering life-cycle**

**The Department of Defense (DoD) has developed and mandated HSI inclusion in acquisition processes**

**NASA has no formal HSI mandate, however...**

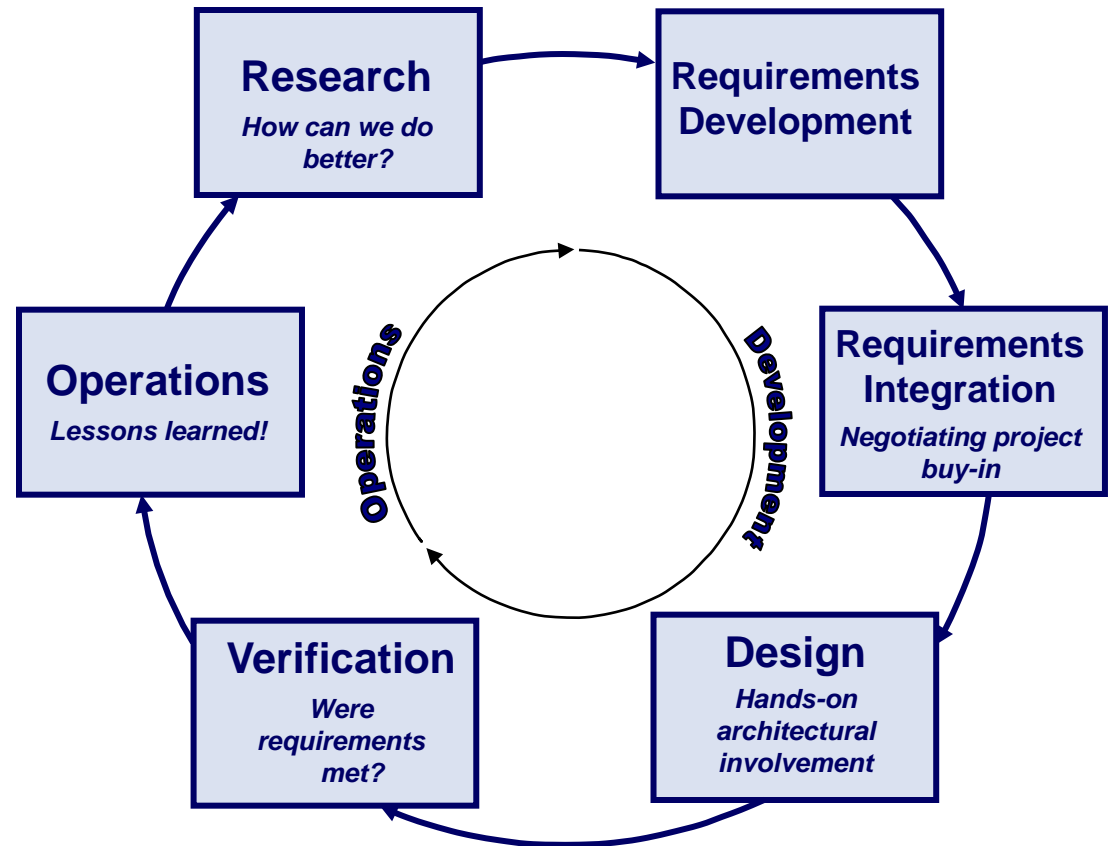
**NASA Space Life Sciences Directorate (SLSD) and Health & Medical Technical Authority processes provide HSI requirements and deliverables to human spaceflight:**

- Human Factors assessments & validation of spacecraft systems
- Habitability requirements & design for spacecraft
- Behavioral Health & Performance capabilities & countermeasures
- Space Medicine capabilities for Exploration
- Environmental Monitoring technologies & strategies
- Human Health Countermeasures & technologies

**SLSD Human Factors personnel have promoted Six Capabilities essential to including HSI into the Systems Engineering life-cycle:**

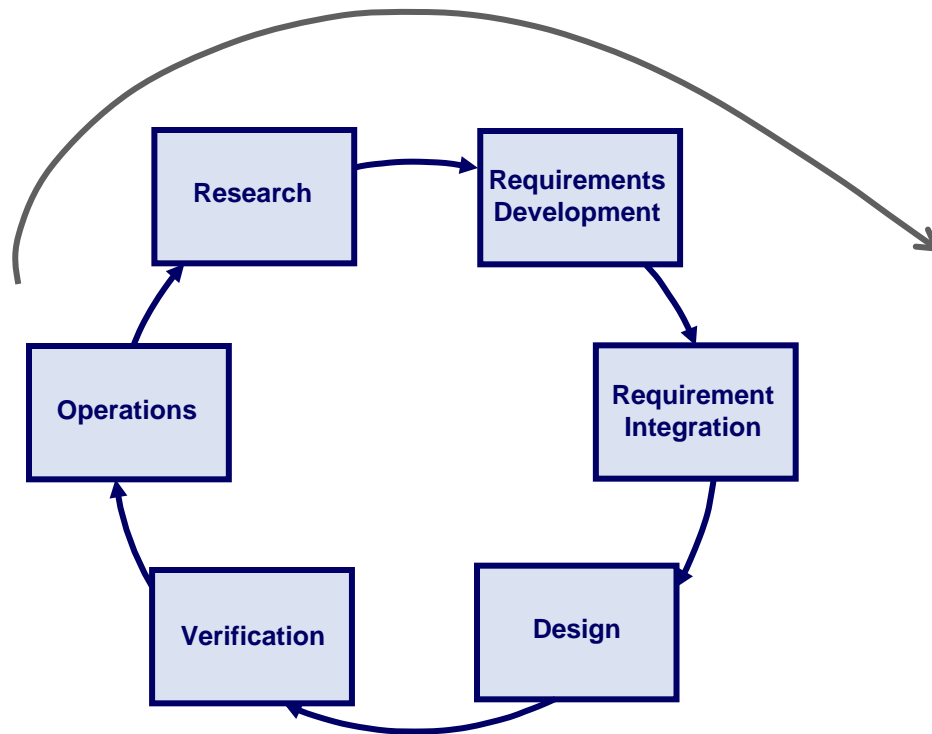
### Required for success:

- 1) Capability competency in each HSI provider's discipline
- 2) Program Managers' buy-in that each discipline may engage in their processes



# Relation: Six Capabilities / SE Process

The Capabilities' sequence tracks the Systems Engineering (SE) life-cycle



<u>Capability</u>	<u>SE Phase</u>
Requirements Reqs Integration Design	<b>Project Formulation</b>
Reqs Integration Verification Design	<b>Development Cycle</b>
Operations	<b>Operations</b>

The Research capability assesses the success of HSI's inclusion throughout the cycle and closes the loop with knowledge to write better Requirements for the future



# Today's NASA HSI Panel

**This Panel addresses SLSD inclusion of HSI in human spaceflight using the Six Capabilities model as an organizing tool**

<b><u>Presenter</u></b>	<b><u>Discipline</u></b>	<b><u>Capability</u></b>
<b>Debbie Berdich</b>	Systems Engineering	<b>Requirements, Requirements Integration, Verification</b>
<b>David Fitts</b>	Habitability	<b>Design</b>
<b>Jennifer Fogarty</b>	Space Medicine	<b>Operations</b>
<b>Lauren Leveton</b>	Behavioral Health & Performance	<b>Research</b>

**Judith Robinson will close by continuing discussion of SLSD's risk-based management of HSI cross-discipline concerns**